Shunyata Research Hydra DPC-6 Digital Power Distribution Center

By Steven Plaskin • Posted: Oct 23, 2014

Hydra DPC-6 Digital Power Distribution Center
Device Type: Power Conditioner
Inlet: IEC-C20
Outlets: 6 isolated outlets
Dimensions (H x W x D): 4 inches X 17 inches X 16.25 inches
Weight: 25.4 pounds

ΞTRON™ α ALPHA HC Power Cable
Device Type: AC Cable
Length: 1.75 Meter
Connector to Hydra: IEC-C19

The Hydra DPC-6 Digital Power Distribution Center is the first power conditioner made by Shunyata Research designed specifically for digital media products. Components such as computers, digital servers, disc-arrays, and cable modems-routers present special problems in terms of noise that pollutes the AC line that is simultaneously serving other audio components adversely affecting the overall sonic performance of our systems. Inexpensive power supplies with their minimal filtration provided with our hard disc arrays and computers produce a significant amount of digital noise. The Hydra DPC-6 electrically isolates these

digital devices and provides a firewall to prevent them from polluting and degrading the sonic performance of the audio components sharing the power line.

Shunyata Research has been building highly regarded AC line conditioners since 2001 with the introduction of the Powersnake Hydra; a component that was uniquely housed in a Corian box with granite panels. I can remember one of my friends bringing over an early Hydra to evaluate in my system. I enjoyed its relative sonic neutrality and the positive improvement it made to the sound of my system. Fast forward to 2014 and one will be truly impressed with the extensive line of Hydra Distribution Centers offered for high end audio-video systems. Not only are the Shunyata products used by high end audiophiles, but are extensively employed by professional audio engineers for recording and mixing applications.

Shunyata research also manufactures an extensive line of AC cables, interconnects, speaker cables, and digital cables that utilize Shunyata's unique designs and patents.

Why Do We Need a Product Like the Hydra DPC-6?
What kinds of issues do audiophiles face when connecting their computers and disc arrays to their audio systems? And what exactly is this noise that seems to be generated by these components? The following is a discussion of noise found in our audio systems written by an engineer friend who wished to remain anonymous:

A workable definition of noise in home audio systems is: Any signal coming out of the speakers that you don't want to be there, excluding non-linear distortions of the original signal. That exception includes harmonic distortion, intermodulation distortion, wow and flutter, etc. Those are problems as well, but although the causes overlap to a degree, it's probably best to think of them separately. The main thing is that noise isn't just some hiss you might hear when you put your ears up to the loudspeakers.

All electrical products generate noise of some kind. In particular, modern products connected to the AC mains generate a good deal of noise. The rectification process to convert incoming AC into DC is very noisy. Lots of harmonics of the 50 or 60 Hertz mains supply frequency are generated and are sent either forward into anything connected to this product or back into the AC mains. If semiconductor diodes are used, they can also generate additional high frequency noise caused by the underlying physics of their switching states.

If a product is digital in nature, the switching pulses generated within often follow the same routes into anything attached or back into the power mains.

Other products generate noise through their control systems or the very mechanism of what makes them work. Microwave ovens for example...

All this noise doesn't magically just disappear into "ground" (perhaps the worst used term in all of engineering) or any other mystical sink hole. In fact, the safety ground connection is often thought of and used as just such a drain for high frequency noise. It's not - it's a safety ground. To some degree, noisy electrical currents flow through anything attached to anything else. Just imagine how complicated the noise currents paths are in your house...

There are really three basic modes for electrical noise transmission:

One is through conduction. That's pretty easy to imagine - connect a wire between product A and product B and there you go.

Conduction really has two modes of its own.

One is called **differential mode**. That's where the currents go through one conductor in a cable or wire pair from the generator to the load and complete the path through the other conductor. This is the one most people think of; this how a lamp works in your home.

The second is a little sneaky. It's called **common mode**. Here, both conductors in a cable or wire pair carry the same electrical current in the same phase. It's like they are connected together in parallel. But, how does this work? Don't you need a return conductor to have a complete current path? Yes, you do. With common mode transmission, the return path often isn't so obvious. It could be the safety ground conductor in the AC power cord and wiring. It could be the shield of your interconnect cable. It could be that ground wire that you so thoughtfully added to the screw in the back of the chassis. OK, common mode is a lot more than a little sneaky.

The third mode is pretty broad - electromagnetic radiation. This is where the magnetic fields of two devices couple to each other. It also is where two products in close proximity couple their electric fields; or even more broadly, when a product picks up a radiated signal such as a radio transmission.

None of these signals are something you want. They can interfere with your desired audio signal. It's not just that hiss, either. It could easily be a signal outside the normal audio frequency range that multiplies (aka, mixes, beats, heterodynes...) with other out of band signals to end up in the audible range. Just as easily, these out of band signals can provoke non-linear operation of an audio product. It's not hard to imagine that if somehow a 150 KHz tone of large enough amplitude managed to find its way into your power amp and actually caused clipping at 150 KHz, your amplifier might not perform so well at audio frequencies. (Not likely to happen, but a little hyperbole sometimes helps in explaining things.) The majority of audio products use feedback to reduce measured distortion and to reject stuff coming in on the power connections. But, once you get above the audio frequencies, most of these products run out of open loop gain, which means that their ability to reject outside influences diminishes rapidly, as does their linearity. The power supply connections now become a very significant input terminal of noise.

The situation has gotten far worse in the past two decades with regard to electrical noise. Switching supplies, a good idea in many ways, can generate tons of noise. The legal requirements for electrical noise generation are pretty loose and also allow for a lot of creativity in solutions. Just about every home appliance has a microprocessor within them now. Do you think appliance manufacturers are eager to add a few dollars of filter component cost to their products just to make life better for audiophiles? So, never mind what kinds of noise the power company has added to the AC mains - the main offenders are usually right in our own homes. The enemy is closer than we want to admit. The power system is really like a giant sewer pipe. It picks up whatever is flushed into it along the way. Even your audio products add to the flow content.

On the audio front, digital electronics have really come to dominate most everybody's audio systems. Many of these - certainly most any computer used to stream music - really aren't the best when it comes to noise generation or noise rejection.

So, what does one do? Scream about how perfect components should be immune to outside noise sources? Will you also scream when the price for the component goes up for this built-in immunity?

A reasonable solution is to use power line filters.

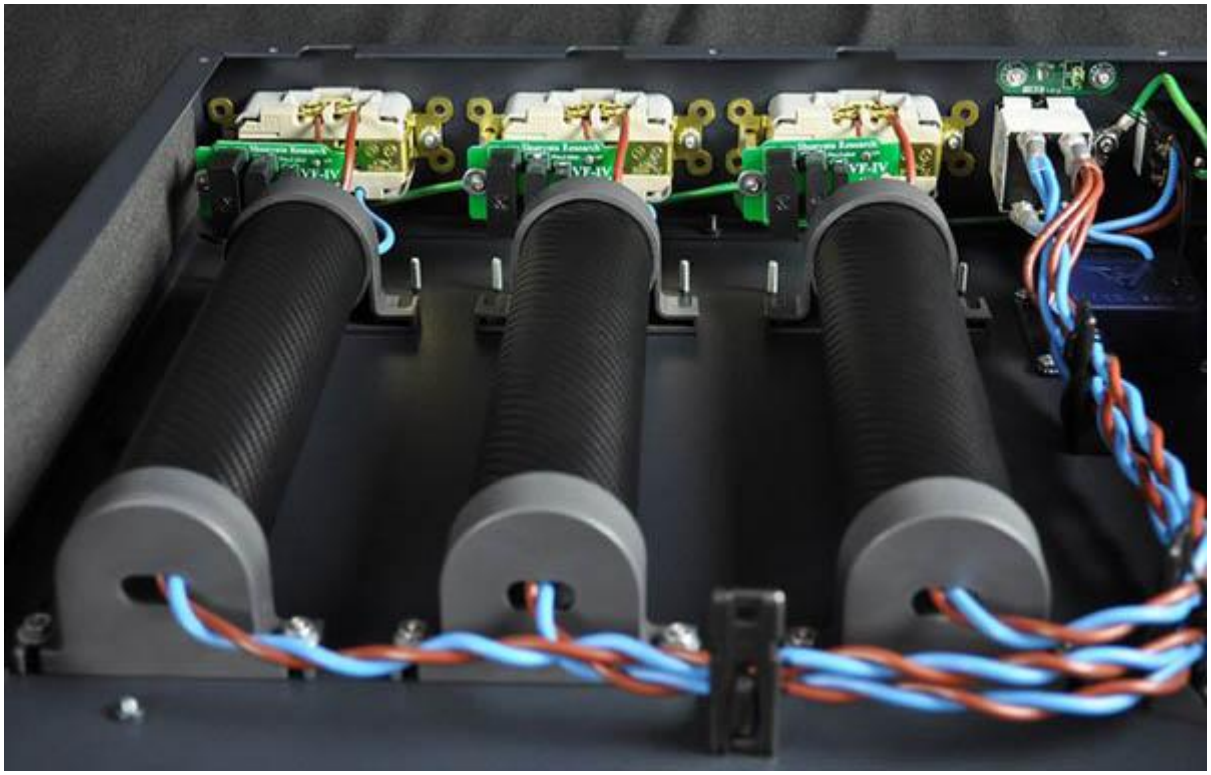
Differential noise is filtered by differential filters. These can either reflect the electrical noise signals to someplace else in the electrical wiring for some other product to deal with, convert the noise into heat, or convert it into common mode noise, again for some other product to deal with.

Common mode noise filters usually attempt to increase the common mode impedance of the circuit connection so that the common mode noise currents are minimized. You might liken this to squeezing down the garden hose to minimize water flow.

Of course, some filter products make an effort to filter both common mode and differential noise. Yes, even power cables have an effect on high frequency transmission of noise.

This isn't easy stuff. Some really smart technologists have built their entire careers around noise reduction in systems and individual products. There are a lot of subtleties and many of the concepts are hardly obvious. A few short paragraphs here really won't make you an expert on the subject. The important point is that this is not some sort of voodoo or snake oil treatment.

The Design of the Hydra DPC-6
Caelin Gabriel, Designer and CEO of Shunyata Research describes the negative sound contributed by digital products as the overriding noise that rides the music signal; grainy gritty sound that is superimposed on the music thus destroying musical reality. The Hydra DPC-6 addresses this issue with in-house built components and designs; some of them patented.



The SDC-Shunyata Digital Coil
Inside the Hydra DPC-6 are three custom hand wound air coils that are specialized for a higher level of high frequency blocking. The challenge for Shunyata was to design and build coils that would filter unwanted high frequency noise products without degrading the sound and the dynamic transient current delivery of the system. Both common mode and differential filtering are addressed in the DPC-6. This custom wound, single lay, air core design is made

with Shunyata Research's own CDA-101 12 gauge power wire. Shunyata Research claims that both micro and macro dynamic range of the music is preserved with their coils.

The VF-IV Filter Array 6 outlets are isolated from each other by Shunyata's VF-IV Filter Array. These are new designs of the filters used in the previous line of Hydra V-Ray conditioners. This capacitive array reduces digital noise without the associated ringing that is found with other capacitive filter designs.

The MPDA Filter:
The multi-phase differential array is a complex surface mount circuit that reduces power-line noise.

SR-Z1 Outlets:
These are specialized outlets built for Shunyata by Hubbell. These outlets were designed by Shunyata to have large internal contacts that provide superior contact integrity for power cords. Ferrous metals have been minimized with no carbon materials to optimize AC performance.

Other features of the SR-Z1 outlet includes oversized design to improve internal cooling capacity when under heavy current loads. The SR-Z1 outlets also undergo Shunyata's proprietary Alpha Cryogenic Process.

LED Fault Indicator:
Included is an L.E.D that indicates the condition of the surge circuitry using a hydraulic electromagnetic breaker.

All of the above are housed in an impressive 16 Gauge powder coated steel chassis with a beautiful aluminum faceplate. Additional isolation treatment is found in this case along with specialized Shunyata isolation footers.

What Does Digital Noise Sound Like
Most of us are acquainted with the concept of digital hardness or lack of natural warmth to the music when discussing the concept of digital coloration. Over the last few months, I have been experimenting with linear power supplies for my hard drives, and now the Hydra DPC-

6. I have found that the SMPS (Switch Mode Power Supply) degrades the sound of my system in other ways as well. In my system, reduction or elimination of the digital noise results in a greater clarity to the sound and not necessarily a warmer sound. Resolution and focus of voices and instruments are improved. Micro dynamics seem more real and noticeable. The soundstage also benefits from elimination of this noise. Digital noise exaggerates the width of the soundstage at the expense of front-to-back depth. Bass is tighter and better defined. Macro dynamic changes are enhanced with a better defined low to mid bass response.

Other Components Used in This Review
An early 2011 MacBook Pro 2.3 GHz Quad Core i7, 16 GB RAM with Samsung SSD was used with a Promise Pegasus and 2 GRAID 8TB Thunderbolt drives for the music libraries. Usually, the 2 GRAID Thunderbolt Drives are used for my music libraries. One has my PCM library, the other my DSD library. I also utilized an HP Computer Quad Core i7 – 4820K processor 3.7 GHz with 16 GB RAM. Operating systems were OSX Mavericks / Yosemite running Pure Music 2.02 and Audirvana Plus 2.02. The MacBook Pro also ran Windows 8.1 Pro 64 bit in Boot Camp with J. River Media 19/20 and Fidelizer 6.1 Pro. The HP computer ran Windows 8.1 Pro. The DAC used in this evaluation was the MSB Technology Analog DAC with Analog Power Base.

Shunyata Research provided a Hydra Triton Power Distribution Center for my stereo components. I connected the Triton to the AC with a ΞTRON™ α ALPHA HC Power Cable. Shunyata also loaned me numerous specialized analog and digital AC cables to try with my system.

My Shunyata Research Hydra V-Ray II Power Distribution Center was also utilized in this review.

Initial Sonic Impressions
Listening to the GRAID 8 TB drives' SMPS and my computers powered by the Shunyata Hydra DPC-6 provided a wake-up call for just how much degradation of my system's sound quality these digital components were creating. I believe many of us become used to these colorations and don't even realize they are there. But once you listen to your system with DPC-6, it becomes very apparent what these small digital power supplies can do to the AC feeding the entire system. I suspect that it is this not-so-subtle overriding noise that drives many listeners to embrace analog vinyl playback. Anyone that is accustomed to listening to a high quality analog rig, even with vinyl's distortions and limitations, will be turned off by the effects of digital noise on their systems.

The overall sound of the system became more relaxed with the elimination of a subtle hardness to the quality of the sound. More surprising, I felt a veil had been lifted from my music with resultant superior clarity and definition. Everything became better defined from top to bottom. The improvement in the micro dynamic quality of instruments was quite striking. The placement of voices and instruments in the soundstage were not only better focused, but the subtle air and ambience of the recording venue was more apparent. The music seemed to have more body and natural fullness that was lacking before I listened with the Hydra DPC-6. Overall, everything sounded more dynamic and alive. Background silence was also enhanced with superior resolution of low level information.

I was curious as to how much better the DPC-6 was for digital components as opposed to the Shunyata Triton power distribution center. As good as the Triton is, and it is very good, the music sounded far superior with the digital components powered by the DPC-6.

Some of you might be wondering if the DPC-6 improved the sound of my MSB Technology Analog DAC. The Analog DAC has a linear power supply that sounded best when connected to the Triton.

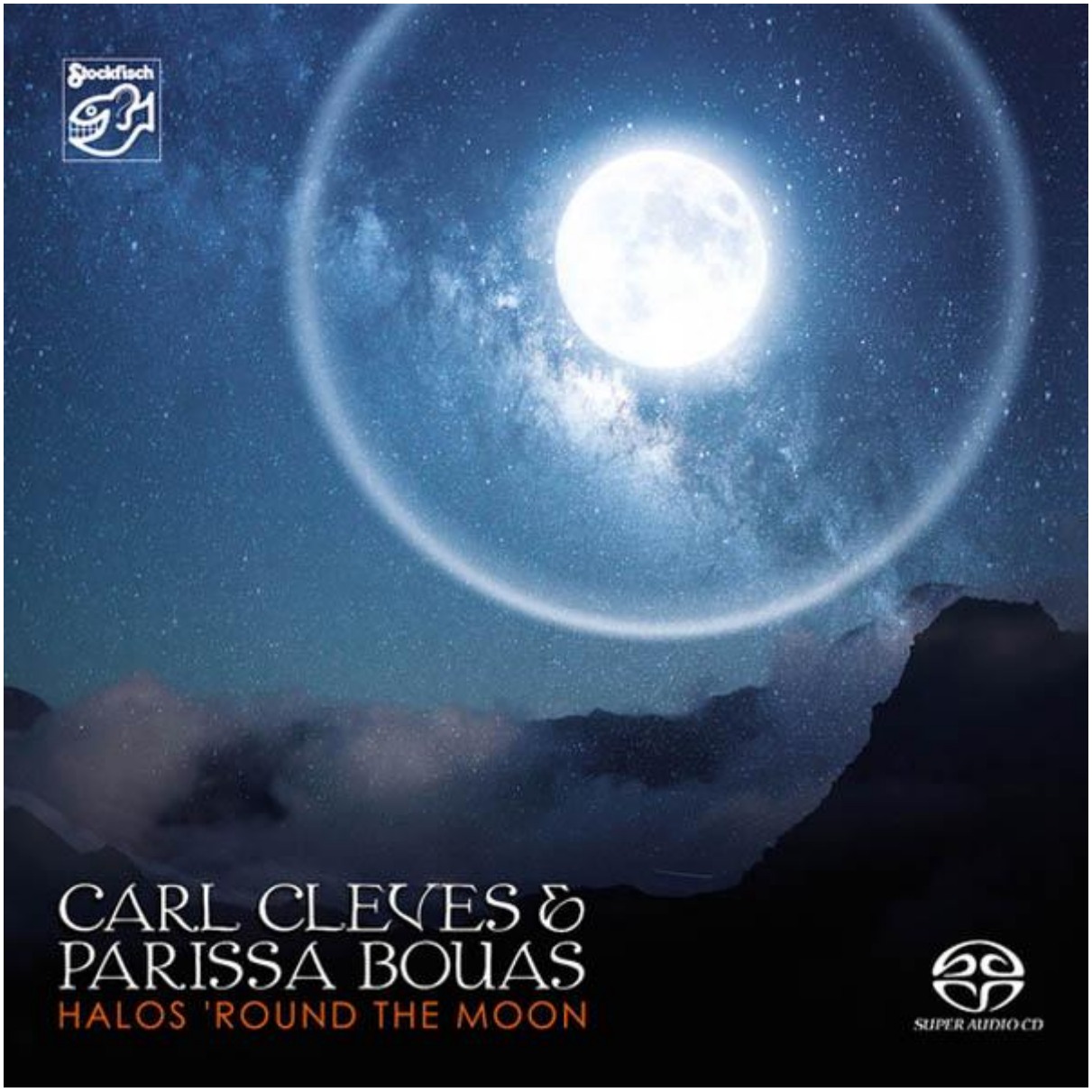
And what about the computer noise transferred to the DAC by the USB cable? I addressed this issue in my review of a Collection of USB Audio Enhancement Products (see review). The solution to this problem is not very expensive to implement.

For those of you interested in auditioning the Hydra DPC-6, the need for a settling-in period is very important for both the DPC-6 and its associated AC cable. The DPC-6 was played extensively by Shunyata before shipping to me, but it still required another 4 days to sound its best.

The DPC-6, Triton, and even the AC cables sound their best when placed on hard surfaces. Shunyata mentioned to me that elevating the AC cords off carpeted floors can result in improved sound. Shunyata also sells upgrade Stainless Steel Feet to enhance the performance of all Hydra Power Distribution Centers.

The Music
Blue Coast Records has recently released a DSD128 version of the excellent recording *Quiles and Cloud Seminole Star*. The title was originally recorded to analog 2 inch tape. As

good as the DSD64 version of this title sounded, the DSD128 version is simply amazing in comparison. This not-so-subtle difference in the sound quality of the two versions was easily heard when using the DPC-6. With the DPC-6, the DSD128 version made the DSD64 version sound veiled and dynamically less alive. The guitar sounded far more real and dynamic with the combination of the DSD128 version and the DPC-6. Removing the DPC-6 from the system robbed the DSD128 version of much of its perceived sonic superiority.



Listening to Carl Cleves and Parissa Bouas *Halos 'Round The Moon*, a DSD64 download from HIGHRESAUDIO, was vastly improved when heard through the DPC-6. The opening drum of the 1st track had more body and weight when heard through the Hydra. The ease and clarity of the voices, as well as the studio mix and over-dubs, had a tube-like bloom and dimensionality.

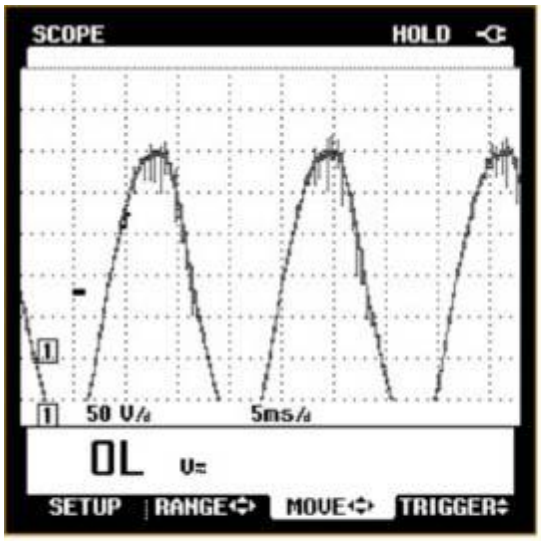
The DSD recording of Mahler's 9th Symphony performed by the San Francisco Symphony / Tilson Thomas made it extremely easy to hear the improvement to my system when using the DPC-6. Without the DPC-6, there was a subtle stridency to the sound of this DSD64 recording. The sound of the orchestra with the DPC-6 had a richer timbre and texture that

was quite easy to hear. The DPC-6 removed a subtle electronic quality to the sound that was apparent to me when not utilizing the DPC-6.

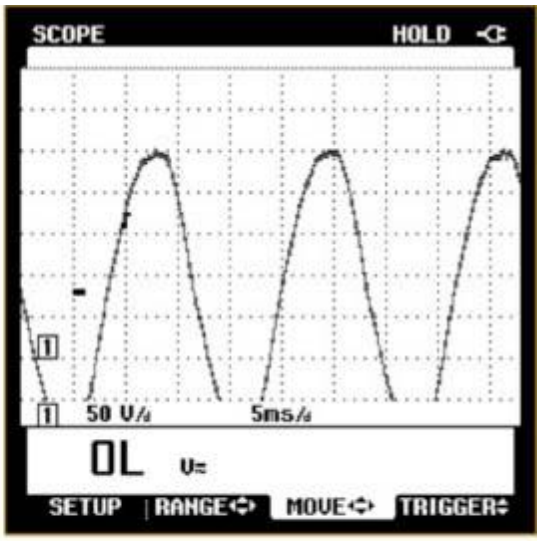
But it was not only DSD titles that benefited from the use of the DPC-6, but PCM titles as well. The Reference Recordings' Doug MacLeod's *There's A Time*, served as an excellent musical example of what the DPC-6 is capable of. This live 24/176.4 recording was made with no overdubs. Doug MacLeod's guitar and vocals were accompanied by Denny Croy on bass and Jimi Bott on drums. The recording was harmonically rich with a weight and slam of the real thing. The transient quickness and impact was greatly reduced when the DPC-6 was taken out of the system. Image solidity and a more relaxed sound resulted with use of the DPC-6.

The Hydra Triton Power Distribution Center
I thought I'd mention my impressions of the Hydra Triton compared to its predecessor, the Hydra V-Ray II. The Triton easily outperforms the V-Ray II in just about every category of performance. Quite frankly, the V-Ray II sounds somewhat veiled and slow in comparison to the Triton. For those looking for the ultimate in black silent backgrounds, the Triton will not disappoint.

The ΞTRON™ α ALPHA HC Power Cable
While not the most expensive AC cable manufactured by Shunyata, I found this cable to be an ideal match for the DPC-6. It is an extremely neutral cable and compliments the DPC-6 very nicely. The ΞTRON™ α ALPHA HC Power Cable also reduces noise as has been demonstrated by Shunyata:



NOISE WITH A STANDARD POWER CABLE



NOISE WITH A ΞTRON ALPHA HC POWER CABLE

There was no dynamic compression or other colorations observed with this cable. I also used it with the Triton to drive my 2 Ayre MX-R amps.

Some of the features of the cable include:

ELECTRICAL CONDUCTORS

- Shunyata ΞTRON™
- 2x10 AWG Coincident Concentric Conductors
- CDA-101 Copper
- Alpha Cryogenic Processed

SHUNYATA CopperCONN™ CONNECTORS

- Pure Tellurium Copper Base Metal
- Nickel plated for corrosion protection
- Superior Contact Grip
- Alpha Cryogenic Treated

A Product that Easily Fulfills Its Goals

The Hydra DPC-6 easily fulfills its goal of acting as a firewall to digitally induced noise. The product is beautifully built and carefully designed with no off-the shelf components to provide an enhanced sonic experience for the computer audiophile. Naturally, its application can extend to LED TV, satellite receivers, or any digital entertainment device. I have yet to find any filter or power conditioner that comes close to the Hydra DPC-6's specialized performance. Removing the Hydra DPC-6 from my system resulted in degraded sound quality and a less enjoyable sonic experience. I commend Shunyata Research for addressing a serious problem that has often been overlooked.